LDW Slip 4 Early Action Area Cleanup – Results of Sediment Monitoring (Year 1)

The cleanup work in the Slip 4 Early Action Area (EAA) covered 3.6 acres, occurring between October 2011 and January 2012. The cleanup included:

- Dredging and excavation of approximately 10,256 cubic yards of contaminated bottom sediment and bank soil
- Transloading and disposal of 17,334 tons of soil, sediment, and debris in a Subtitle D landfill, including approximately 130 tons of creosote-treated timbers and piles
- Demolition of 20,019 square feet of concrete pier structure
- Recycling of 3,278 tons of concrete and 79 tons of steel (from demolition of the pier)
- Construction of sediment caps, and slope caps over 3.43 acres using 53,006 tons of clean material. Sediment caps and slope caps were constructed to isolate sediments that were not removed
- Construction of stable slopes and expanded habitat in former upland areas.

Overall, as a result of the Slip 4 EAA cleanup, contaminated sediments were removed and habitat was significantly improved with a net gain of over an acre of shallow and riparian habitat for threatened Puget Sound Chinook and Coastal/Puget Sound bull trout.

Findings from the 2013 Year 1 monitoring are as follows:

- The new beaches, sediment cap, and backfill remain structurally stable and fully functional.
- Minor physical changes have occurred within the Slip 4 EAA as a result of sediment deposition. Sediment deposition generally consisted of finer-grained sediment, which ranged from 0 to 8-cm thickness, overlying the gravelly/rocky substrate of the cap. Propwash-induced re-suspension of

sediments from outside the Slip 4 EAA is the most likely source of depositional sediments within the EAA.

- Overall, chemical concentrations within the Slip 4 EAA have increased when compared to 2012 post-construction baseline concentrations. This increase is not unexpected given that the 2013 post-construction concentrations represent baseline conditions of the clean imported cap material, and sediments from the outer portion of Slip 4 and the majority of the Duwamish Waterway have not yet been cleaned up. Elevated sediment concentrations within the EAA are associated with the overlying finer-grained sediment deposits which are most likely from re-suspension of sediment. The sediment cap continues to function as designed.

- Sediment samples were collected from the top 10-cm at eight locations in the Slip 4 EAA during the year 1 monitoring event, and none of the results exceeded Washington State Sediment Management Standards (SMS) cleanup screening levels (CSL). There were only two minor exceedances of the SMS sediment quality standards (SQS) within the waterway cap area of the EAA. The total PCB concentration at location WC-3 was 12.3 mg/kg OC compared to the SQS of 12 mg/kg OC. The BEHP concentration at location WC-1 was 47.9 mg/kg OC compared to the SQS of 47 mg/kg OC. Given how ubiquitous BEHP is in sediments in urban and industrial settings, this detection is not unexpected (SPWG 2007[1,2]).

- 2013 PCB concentrations in the EAA ranged from non-detect values (3.7 µg/kg dry weight) to 490 µg/kg. These concentrations are substantially lower than pre-construction concentrations (360 to 5,000 µg/kg dry weight)

[1] SPWG. 2007. Sediment Phthalates Work Group – Summary of Findings and Recommendations. Prepared by City of Tacoma, City of Seattle, King County, Washington State Department of Ecology, U.S. Environmental Protection Agency; with assistance from Floyd Snider, Seattle, WA.

[2] http://www.ecy.wa.gov/puget_sound/toxicchemicals/actions.html
http://www.kingcounty.gov/environment/wastewater/IndustrialWaste/SourceControl/Duwamish/Pollutants.aspx
http://cms.cityoftacoma.org/surfacewater/033109/Foss-4.pdf

and are generally lower than concentrations in the outer portions of the slip (133 to 620 µg/kg).

- Source Control – A number of source control actions were completed prior to construction of the Slip 4 EAA or are ongoing (e.g., business inspections, source tracing, etc.). Prior to construction of the Slip 4 EAA remedy a number of source control actions were completed at North Boeing Field and Georgetown Steam Plant (GTSP). These actions included:
    - Removal of the GTSP flume and associated contaminated soil and sediment[3];
    - Removal of PCB containing soil from North Boeing Field (NBF) and GTSP upland properties; and
    - Installation of a long term stormwater treatment system (LTST) at North Boeing Field. The majority of stormwater generated on NBF is treated in this LTST prior to discharge to Slip 4. The first annual report from monitoring of the LTST indicates that in general concentrations of all monitored parameters, including total suspended solids, increased during storm events; however, all concentrations remained below marine chronic water quality criteria[4].
- Based on observations from the visual survey, evaluation of potential sources of depositional sediments, and 2013 data (AMEC 2013[5]) collected in Slip 4 and in the Lower Duwamish Waterway, the most likely source of fine sediments that deposited on the cap is re-suspended sediments from beyond the Slip 4 EAA.

[3] Herrera. 2010. Removal Action Completion Report, Georgetown Flume Removal and Demolition, Prepared for Seattle City Light, February 17.

[4] Landau. 2013. Annual Performance Evaluation Report, Long-term Stormwater Treatment 2011-2012, North Boeing Field, Seattle, Washington. Prepared by Landau Associates, Edmonds, WA.

[5] AMEC. 2013. Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2: 2012-2013 Construction Season Completion Report. Prepared for The Boeing Company, Seattle, WA. AMEC Environment & Infrastructure, Inc., Lynnwood, WA. October 1.